The ADVENTURES OF ZACK & MAX

VOLUME 1

The Odyssey Begins

$4.95 U.S.

COMIC BOOK 1
COMIC BOOK 1 Ham Radio Comic
(UPC) 731797113306

ICOM
www.icomamerica.com

Welcome to the World of Ham Radio!

Thank you for your interest in The Adventures of Zack and Max - The Odyssey Begins. This is your first step in discovering the excitement of amateur radio (also known as ham radio).. This story is designed to provide you with basic information about ham radio – its history, its applications, and its relevance in the world today.

We hope you have fun reading this story. We had fun creating it, and encourage you to get involved in this wonderful hobby. Whether you're a student or an adult, we feel this book tells the story of ham radio well enough for you to read it again and again. And, if you do find it interesting and informative, please pass it on to a friend! For information on how to become a ham, see the inside back cover of this book. Enjoy!

About ICOM, Inc.

ICOM, Inc., founded by Tokuzo Inoue, JA3FA, is a worldwide leading manufacturer of Amateur and other radio equipment. Headquartered in Osaka, Japan, ICOM entered the radio business over 45 years ago, creating some of the first transistorized amateur radio transceivers. Today, ICOM is proud to continue its advancement of the hobby by offering a wide range of amateur radios – from cutting-edge, digital technology, base transceivers to innovative handheld radios. ICOM is always working to improve its products by employing the latest technology, listening to customer suggestions, and drawing from experience in the radio industry.

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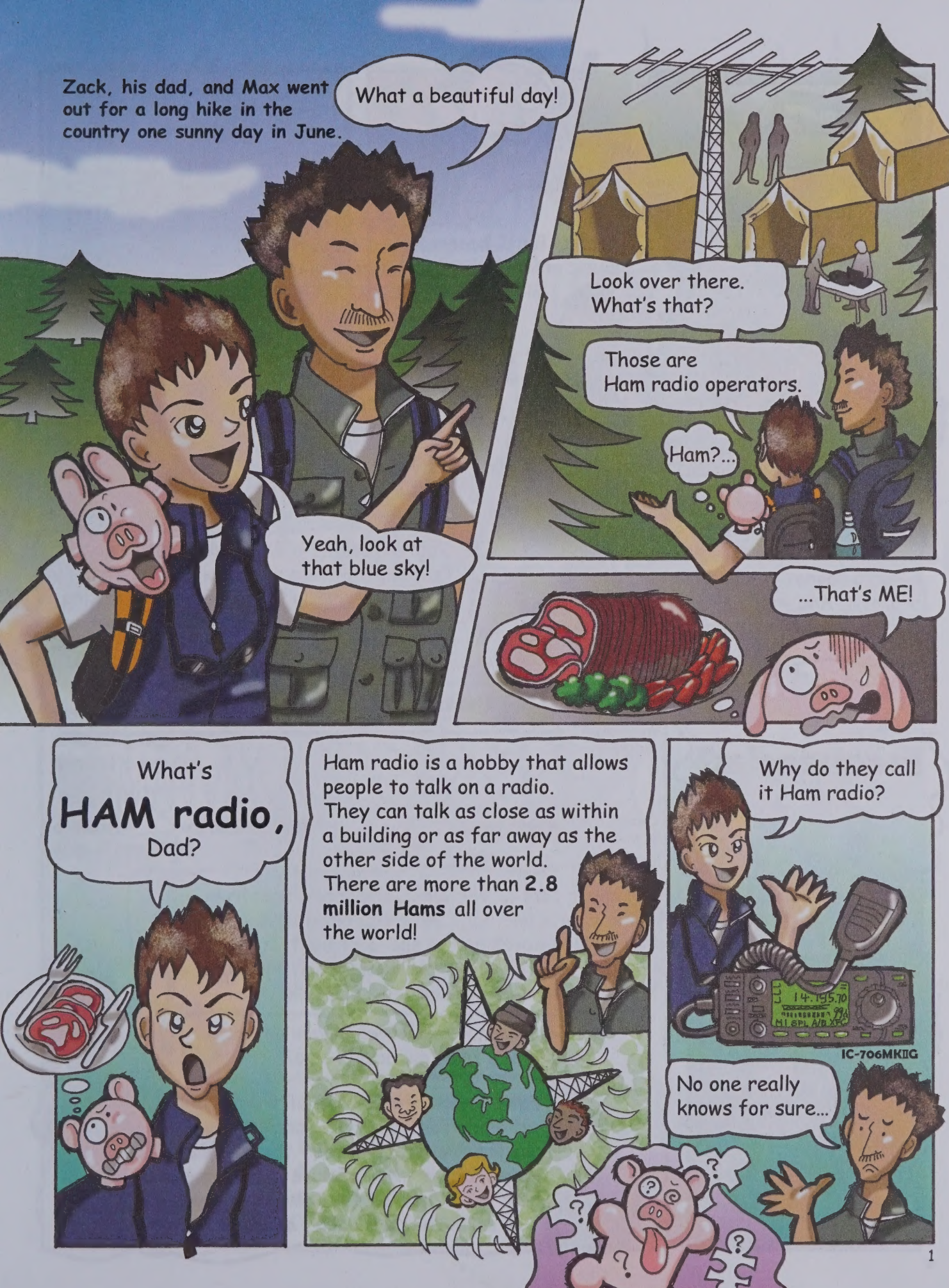
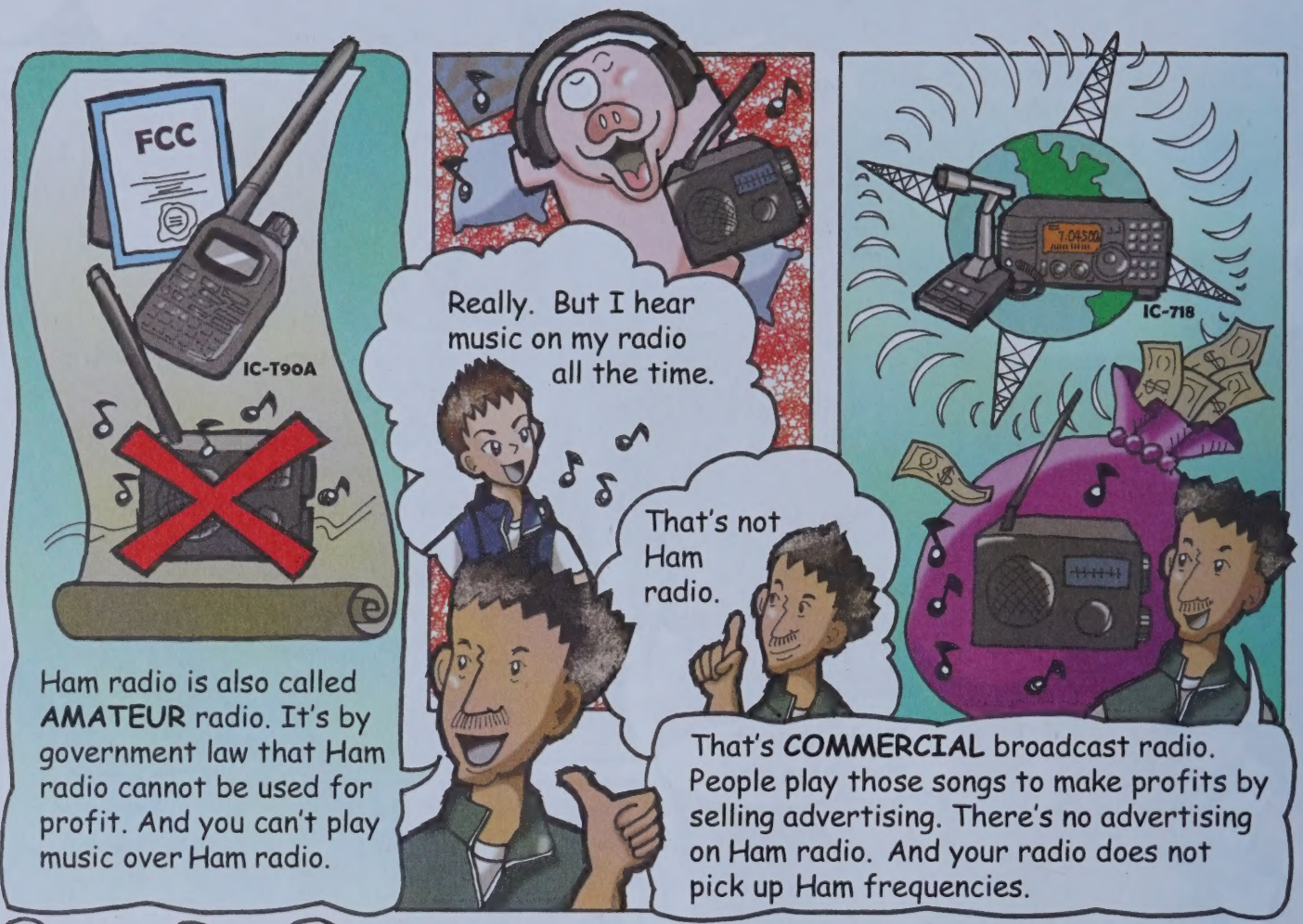
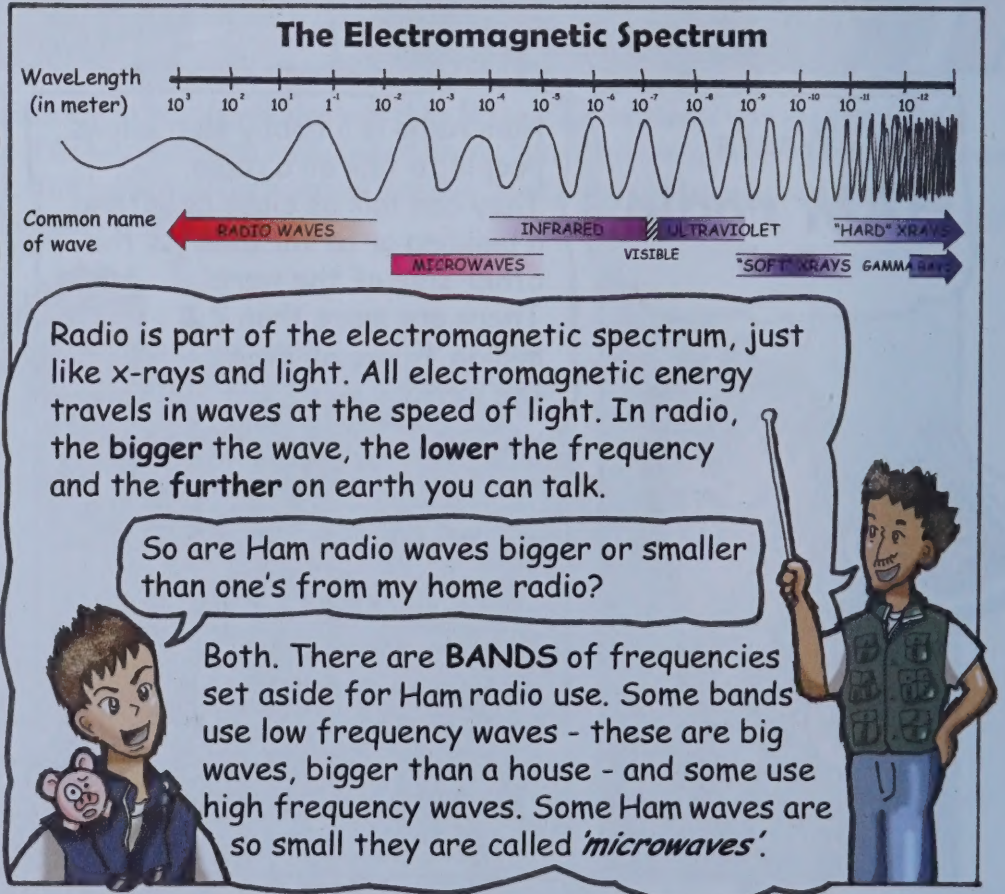
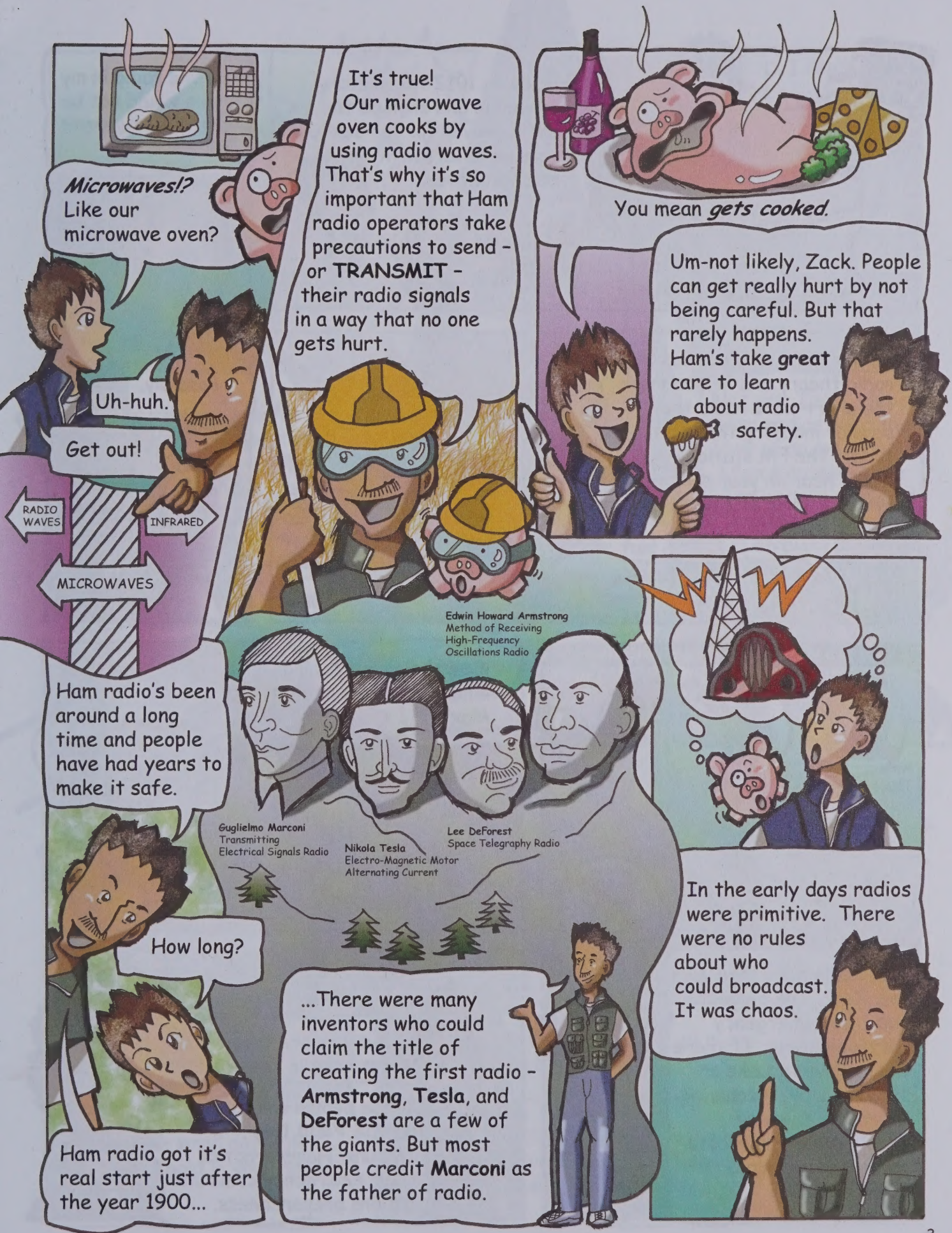
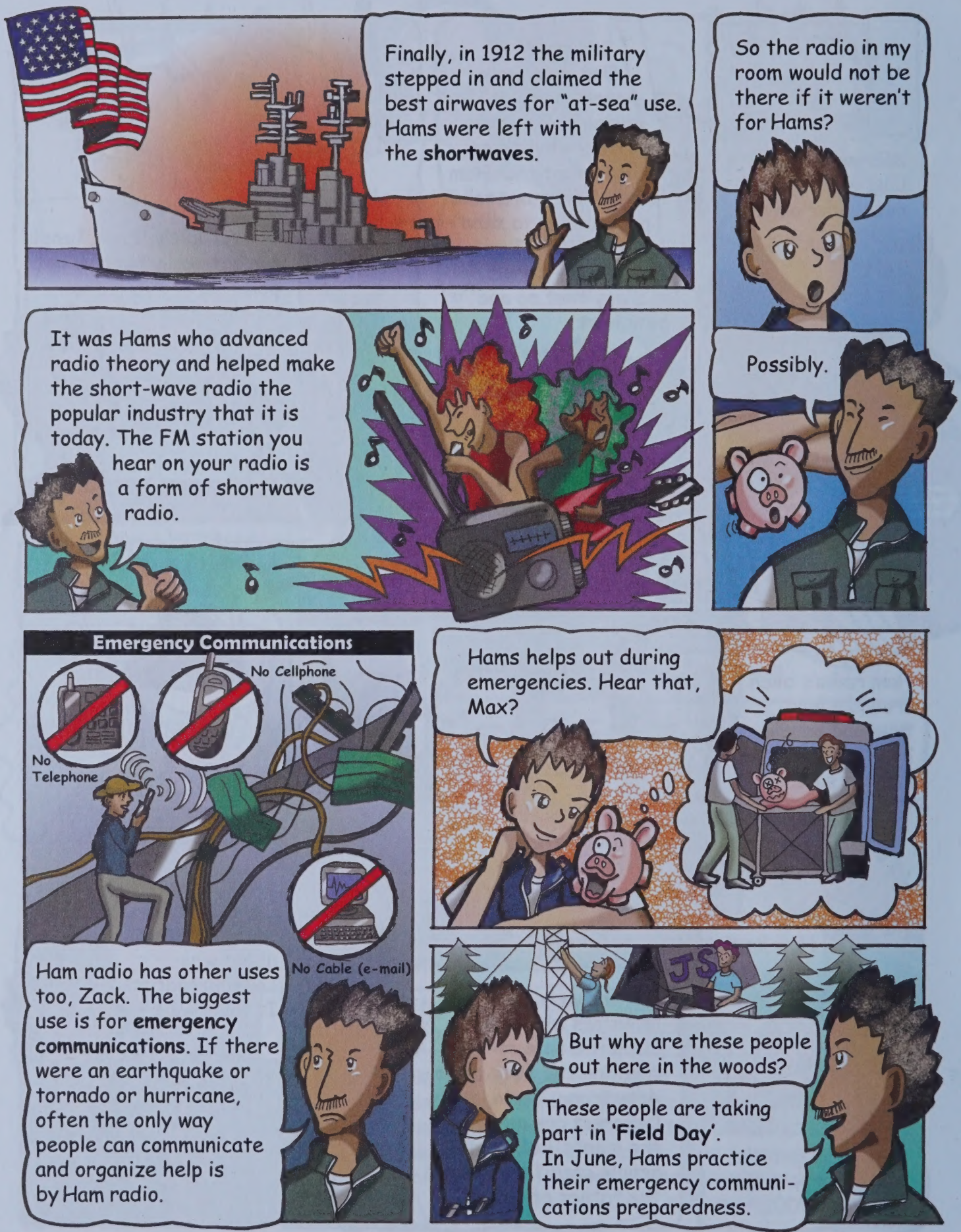

Zack, his dad, and Max went out for a long hike in the country one sunny day in June.
What a beautiful day!
Yeah, look at that blue sky!
Look over there. What's that?
Those are Ham radio operators.
Ham?...
...That's ME!
What's HAM radio, Dad?
Ham radio is a hobby that allows people to talk on a radio. They can talk as close as within a building or as far away as the other side of the world. There are more than 2.8 million Hams all over the world!
Why do they call it Ham radio?
IC-706MKIIG
No one really knows for sure...


FCC
IC-T90A
Really. But I hear music on my radio all the time.
That's not Ham radio.
IC-718
Ham radio is also called **AMATEUR** radio. It's by government law that Ham radio cannot be used for profit. And you can't play music over Ham radio.
That's **COMMERCIAL** broadcast radio. People play those songs to make profits by selling advertising. There's no advertising on Ham radio. And your radio does not pick up Ham frequencies.

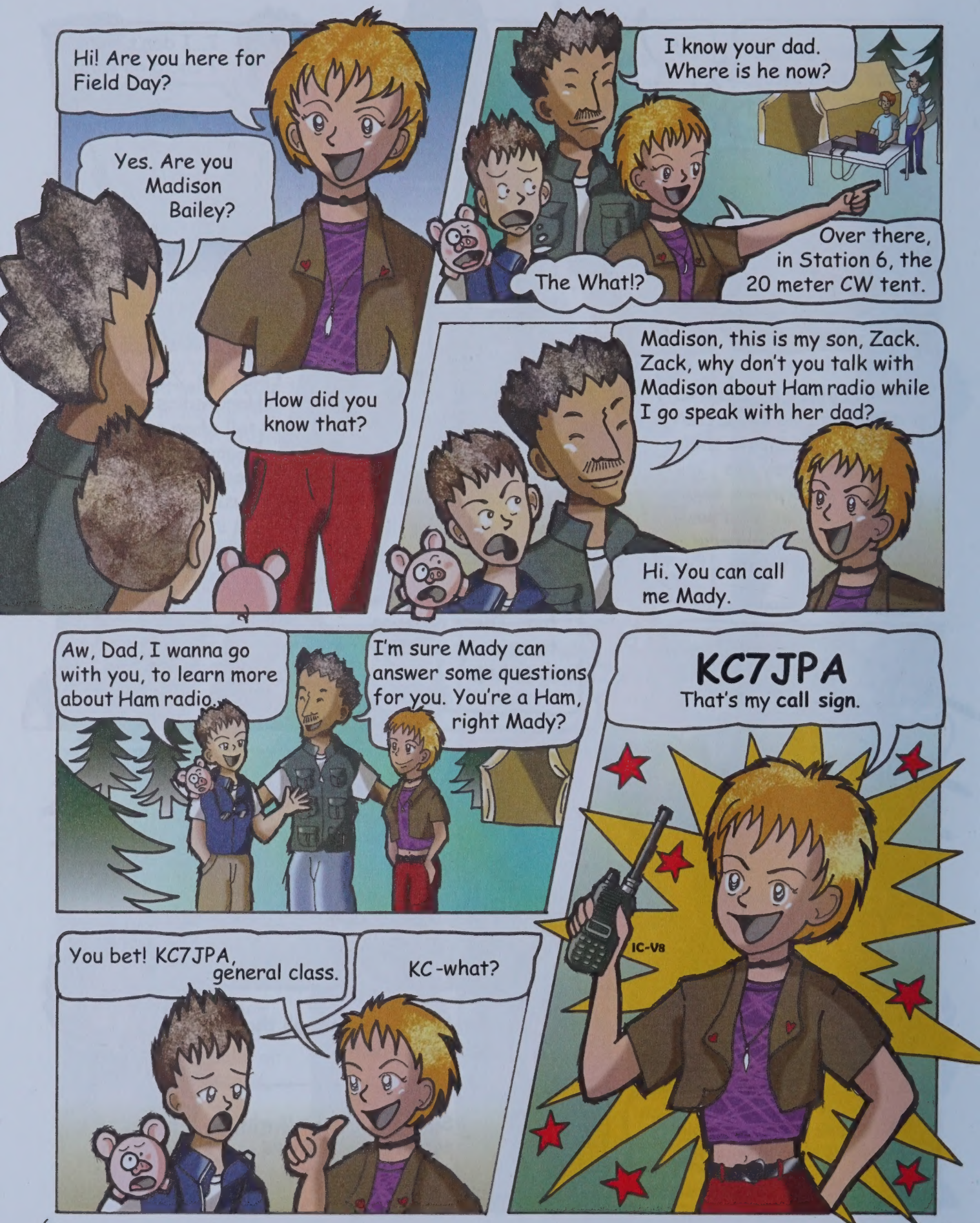
Frequencies?


The Electromagnetic Spectrum
WaveLength (in meter)
10^{3} 10^{2} 10^{1} 1^{-1} 10^{-2} 10^{-3} 10^{-4} 10^{-5} 10^{-6} 10^{-7} 10^{-8} 10^{-9} 10^{-10} 10^{-11} 10^{-12}
Common name of wave
RADIO WAVES
MICROWAVES
INFRARED
VISIBLE
ULTRAVIOLET
"HARD" XRAYS
"SOFT" XRAYS
GAMMA RAYS
Radio is part of the electromagnetic spectrum, just like x-rays and light. All electromagnetic energy travels in waves at the speed of light. In radio, the **bigger** the wave, the **lower** the frequency and the **further** on earth you can talk.
So are Ham radio waves bigger or smaller than one's from my home radio?
Both. There are **BANDS** of frequencies set aside for Ham radio use. Some bands use low frequency waves - these are big waves, bigger than a house - and some use high frequency waves. Some Ham waves are so small they are called *'microwaves'*.

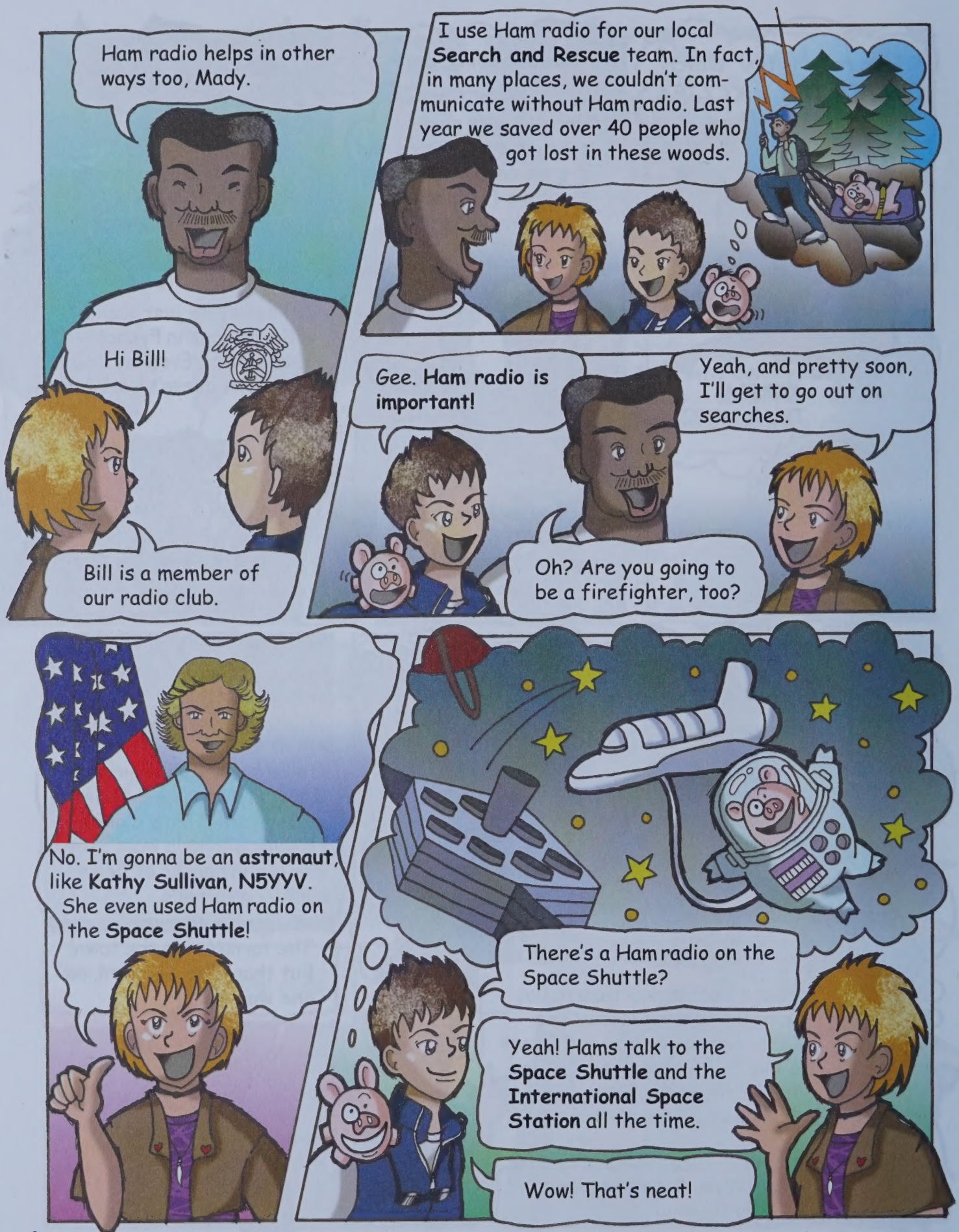

Microwaves!? Like our microwave oven?
Uh-huh.
Get out!
RADIO WAVES
INFRARED
MICROWAVES
It's true! Our microwave oven cooks by using radio waves. That's why it's so important that Ham radio operators take precautions to send - or TRANSMIT - their radio signals in a way that no one gets hurt.
You mean gets cooked.
Um-not likely, Zack. People can get really hurt by not being careful. But that rarely happens. Ham's take great care to learn about radio safety.
Edwin Howard Armstrong
Method of Receiving
High-Frequency
Oscillations Radio
Guglielmo Marconi
Transmitting
Electrical Signals Radio
Nikola Tesla
Electro-Magnetic Motor
Alternating Current
Lee DeForest
Space Telegraphy Radio
Ham radio's been around a long time and people have had years to make it safe.
How long?
Ham radio got it's real start just after the year 1900...
...There were many inventors who could claim the title of creating the first radio - Armstrong, Tesla, and DeForest are a few of the giants. But most people credit Marconi as the father of radio.
In the early days radios were primitive. There were no rules about who could broadcast. It was chaos.


Finally, in 1912 the military stepped in and claimed the best airwaves for "at-sea" use. Hams were left with the **shortwaves**.
So the radio in my room would not be there if it weren't for Hams?
Possibly.
It was Hams who advanced radio theory and helped make the short-wave radio the popular industry that it is today. The FM station you hear on your radio is a form of shortwave radio.
Emergency Communications
No Cellphone
No Telephone
No Cable (e-mail)
Hams helps out during emergencies. Hear that, Max?
Ham radio has other uses too, Zack. The biggest use is for **emergency communications**. If there were an earthquake or tornado or hurricane, often the only way people can communicate and organize help is by Ham radio.
But why are these people out here in the woods?
These people are taking part in '**Field Day**'. In June, Hams practice their emergency communications preparedness.

Generator
Electricity
Power
Solar Power
There is often no electricity available during a disaster. Hams have to create their own power. They use portable generators, solar panels, water or wind power; and batteries to generate their own electricity.
I...I don't think I could do that!
Dipole Antenna
Not yet, Zack. Not all Ham radios need that tall of an antenna. Some antennas are as easy to set up as running a long straight wire to a tree.
Dad. This looks like fun!
It is, and it's hard work too. These antenna towers are not easy to put up.
There are small portable antennas hold in your hand, too!
Can we go see what all those people are doing?
Sure. Hams like it when people ask questions about their hobby.


Hi! Are you here for Field Day?
Yes. Are you Madison Bailey?
How did you know that?
I know your dad. Where is he now?
The What!?
Over there, in Station 6, the 20 meter CW tent.
Madison, this is my son, Zack. Zack, why don't you talk with Madison about Ham radio while I go speak with her dad?
Hi. You can call me Mady.
Aw, Dad, I wanna go with you, to learn more about Ham radio.
I'm sure Mady can answer some questions for you. You're a Ham, right Mady?
KC7JPA
That's my call sign.
IC-V8
You bet! KC7JPA, general class.
KC-what?

Ham radio is fun! Watch! W7PZ. This is KC7JPA.
KC7JPA. This is W7PZ.
How's it going, Dad?
Great! I just made contact with Mexico and France on 20 meters. Meet me for lunch at 13 hundred hours.
Okay, see you then. KC7JPA, out.
W7PZ, clear.
No Service
Did he say he just spoke with someone in **France**? That's neat! Even my Dad's cell phone doesn't work here.
FRA E
HELP!
IC-V8000
That's what makes Ham radio so great for **emergency use**. Last summer my Dad and I took a trip to Oklahoma, to visit my Aunt Stacey. On the way, there was a tornado warning!
Wow, I've never seen a tornado.
It was scary – only one town away. My Dad is a member of **Skywarn**. That's a group of Hams who help warn people who are in danger of being hurt by a tornado.
The tornado hit the town! But thanks to Skywarn, **no one was hurt**.


Ham radio helps in other ways too, Mady.
Hi Bill!
Bill is a member of our radio club.
I use Ham radio for our local **Search and Rescue** team. In fact, in many places, we couldn't communicate without Ham radio. Last year we saved over 40 people who got lost in these woods.
Gee. **Ham radio is important!**
Yeah, and pretty soon, I'll get to go out on searches.
Oh? Are you going to be a firefighter, too?
No. I'm gonna be an **astronaut**, like **Kathy Sullivan, N5YYV**. She even used Ham radio on the **Space Shuttle**!
There's a Ham radio on the Space Shuttle?
Yeah! Hams talk to the **Space Shuttle** and the **International Space Station** all the time.
Wow! That's neat!

What's going on over there?
You mean the **spectrum.**
That's right!
My Dad was telling me about the spectrum.
20
80Meters
Your Dad was right. That tent over there is working the 80 meters band. Let's go check it out.
Each of these tents is radio station. Each station is working a different **BAND**.
80Meters
40Meters
Hey, I thought you weren't a Ham.
"CQ Field Day, CQ Field Day, November, 7, India, Hotel."
"CQ Field Day, CQ Field Day, November, 7, India, Hotel."
Did he say **Indian Hotel**???
India, **Hotel**. That means the letters **I** and **H**. Using words can be easier to understand than letters.
November, 7, India, Hotel is **N7IH**, which is our **club callsign**.
Ha ha ha
Hams have a lot of fun with their callsigns. My friend's callsign is **KB9PBJ**. We call him Kilo, Bravo, 9, **Peanut Butter and Jelly**.
For official identification, Hams use a standard **"Phonetic Alphabet"**

Is that a **radio** they're using? It doesn't look like any radio I've ever seen.

IC-756PROII

Ham radio is a hobby, and Hams hold **contests** to see **how far** and **how often** they can make a "**QSL**" or two-way contact.

That's a radio all right. We call it a **BASE STATION**. Ham radio isn't just for emergencies or search and rescues. Many people use Ham radio just for **fun**, too. It's pretty neat knowing you can talk to some other Ham in a country 6,000 miles away with nothing but air between the two of you.

Then, Hams may exchange **QSL** cards by mail or by the Internet as an Acknowledgment Contact.

DJ is working to get as many contacts as possible and Sharon is entering callsigns into a computer for future contact verification. These competitions can get very intense. Let's listen.

N7IH
Novem
5A W
5 Alpha

CQ...brzap...Whisky 1 albbbaa weeee... bchhh...five nine...Field...go ahead sierra fox...ccchhh...dididtdidid...

Whisky 1 station. This is N7IH. Please repeat.

That doesn't sound like anything to me...

Just Wait. There's a lot of **TRAFFIC** on the airwaves today.

CQ...brzap...Whisky 1 Alpha Whisky bchhh...eigh...conne.... cut.....Field...go ahead

W1AW. This is N7IH.

N7IH. This is W1AW. We are 8A CT. QSL?

Roger, you are 8, Alpha, Connecticut. We are 5 Alpha, Western Washington. W1AW, thanks for the contact and good luck with your contest.

Hey how did he do that? That person came in **really clear**.

IF-DSP Filter

There are a number of reasons why the call could have come in so strong: the station could be close by; or the other operator could be using a very powerful station; or DJ could have tweaked the **IF-DSP**...

The what?

IF-DSP

Analog Signal

IF-DSP Filter

01101010
10100101

Digital Signal

IF-DSP. It is like the sound card that you have in your computer.

Yeah, it's like having the hottest chip inside your radio!

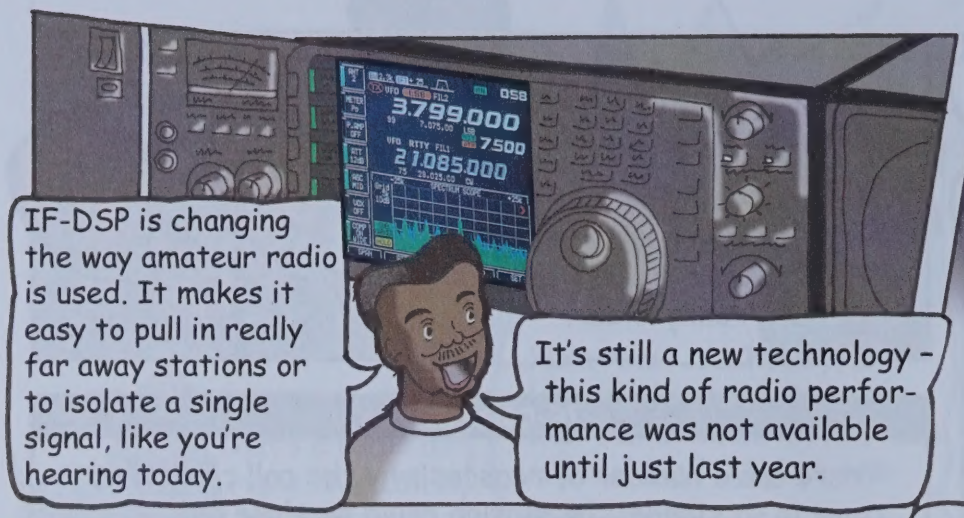
Wow! Just like my computer!

And, MP3's are a type of IF-DSP processing.

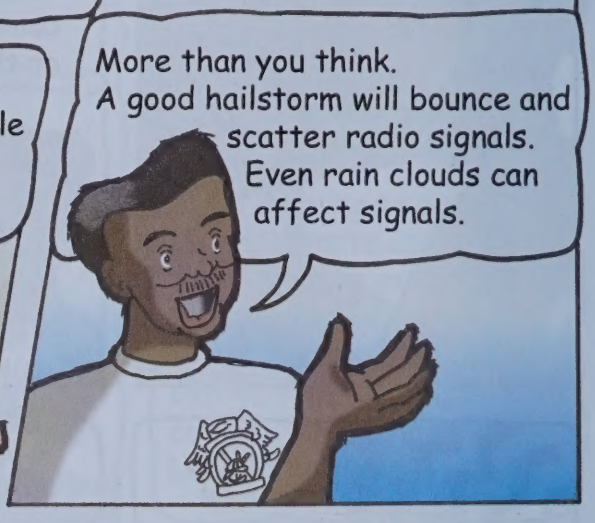
I listen to MP3's on my Mpeg player all the time. IF-DSP must be really powerful!

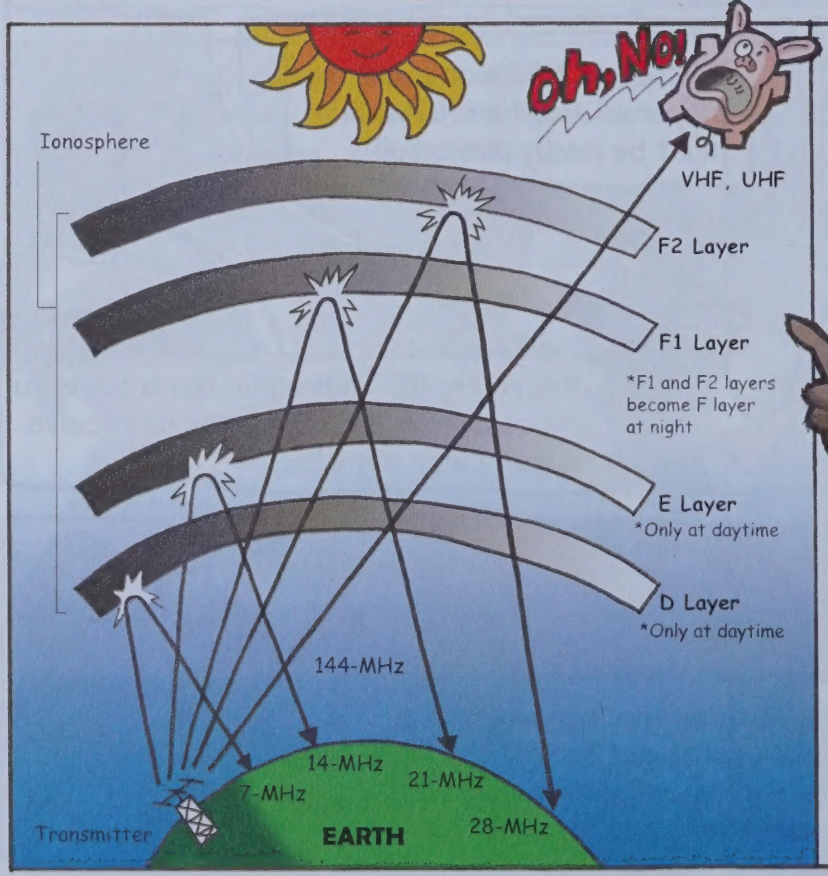
You're right! That radio has a powerful processor inside that helps us receive **super clear signals**.

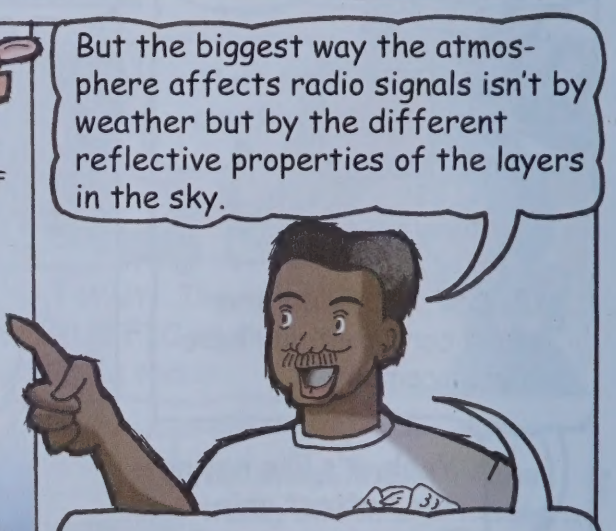
DJ is shaping the incoming radio signal to get rid of noise and focus in on the signal he wants to listen to.


IF-DSP is changing the way amateur radio is used. It makes it easy to pull in really far away stations or to isolate a single signal, like you're hearing today.
It's still a new technology - this kind of radio performance was not available until just last year.

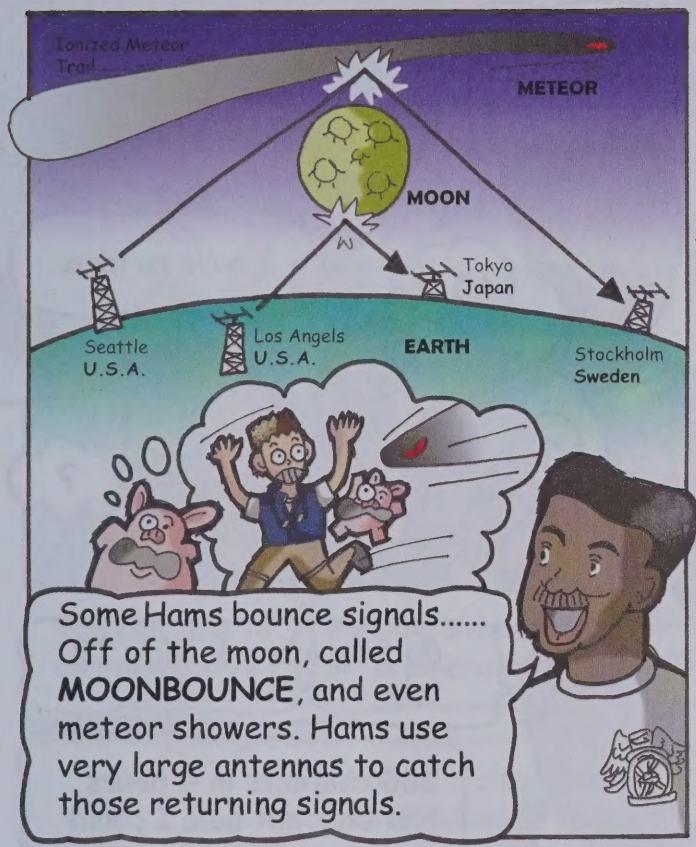
Bill, what was the other way you were gonna say that can help us hear signals clearly?
It could have been favorable atmospheric conditions.
What does the atmosphere have to do with radio signals?





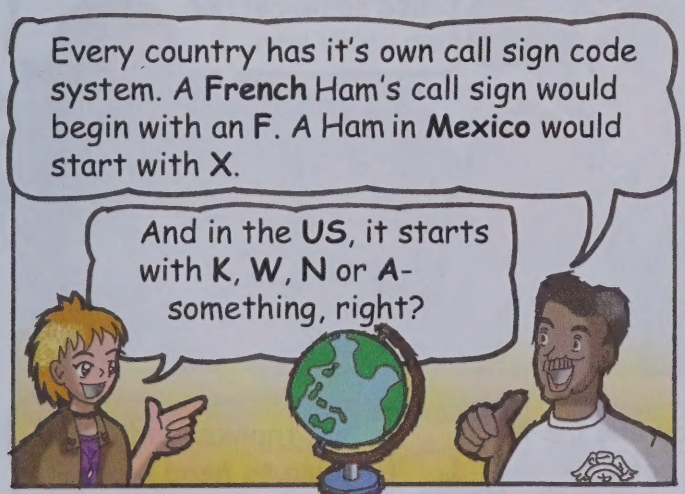

But the biggest way the atmosphere affects radio signals isn't by weather but by the different reflective properties of the layers in the sky.

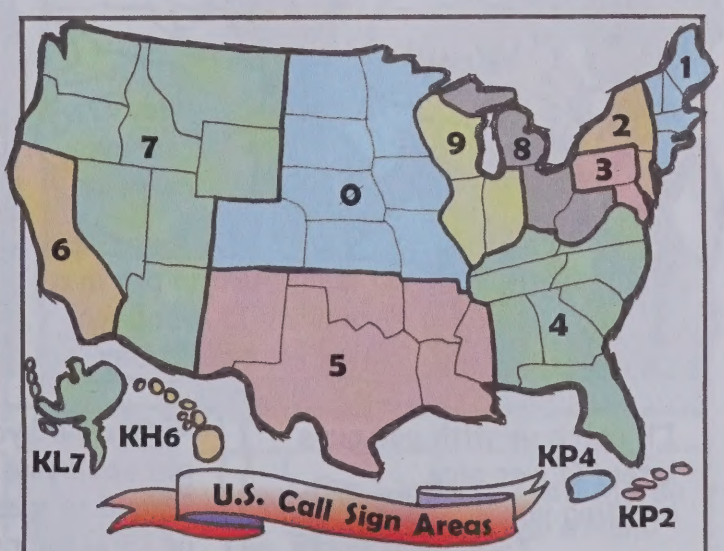
There are transition zones in the sky, so the closer to earth you are, the thicker the atmosphere-usually. Each area affects radio signals differently. And radio signals travel in a straight line. On Very High Frequencies the signals usually travel directly into space.

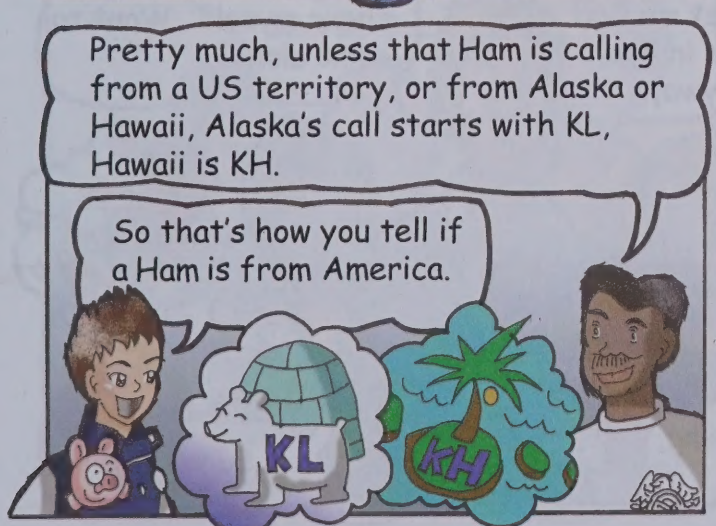

Ionized Meteor Trail
METEOR
MOON
Tokyo
Japan
Seattle
U.S.A.
Los Angels
U.S.A.
EARTH
Stockholm
Sweden
Some Hams bounce signals..... Off of the moon, called **MOONBOUNCE**, and even meteor showers. Hams use very large antennas to catch those returning signals.

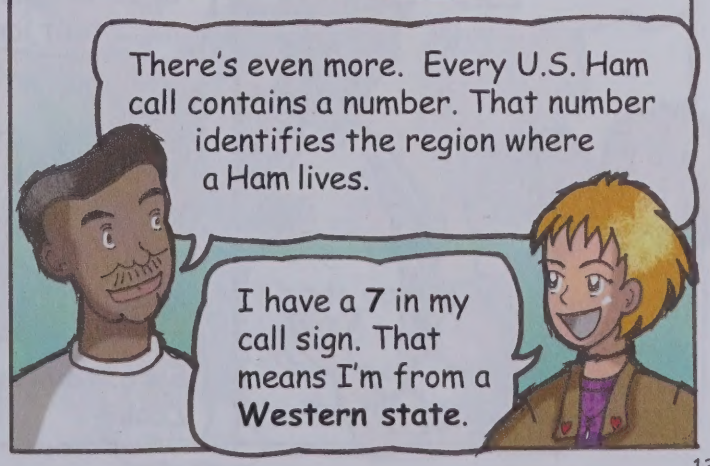
Woooaaahh. That rocks!
Whoaaahh

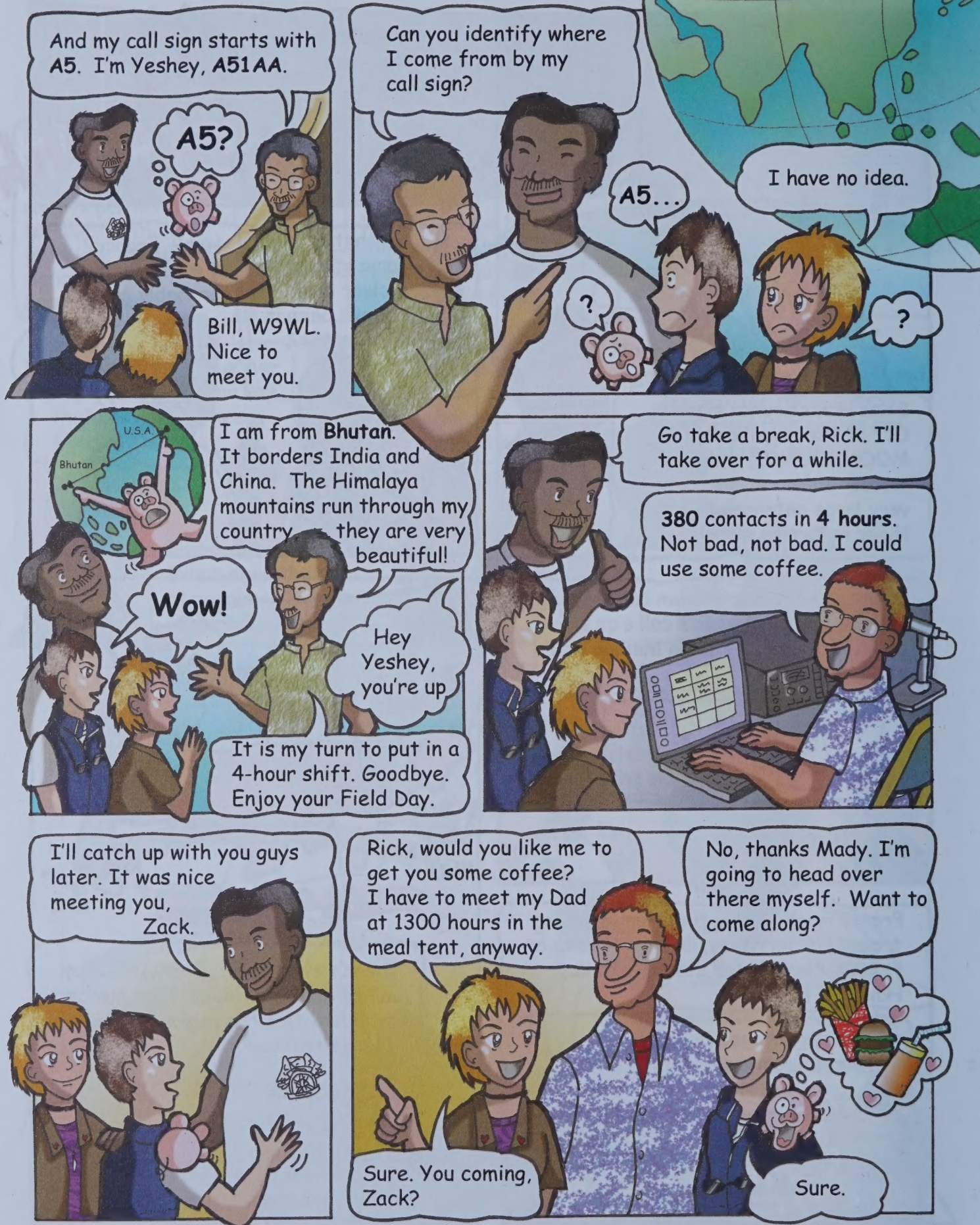
So that guy who came in loud and clear could have been in France?
Huh? France? I guess so. But, probably not, his call sign was American.

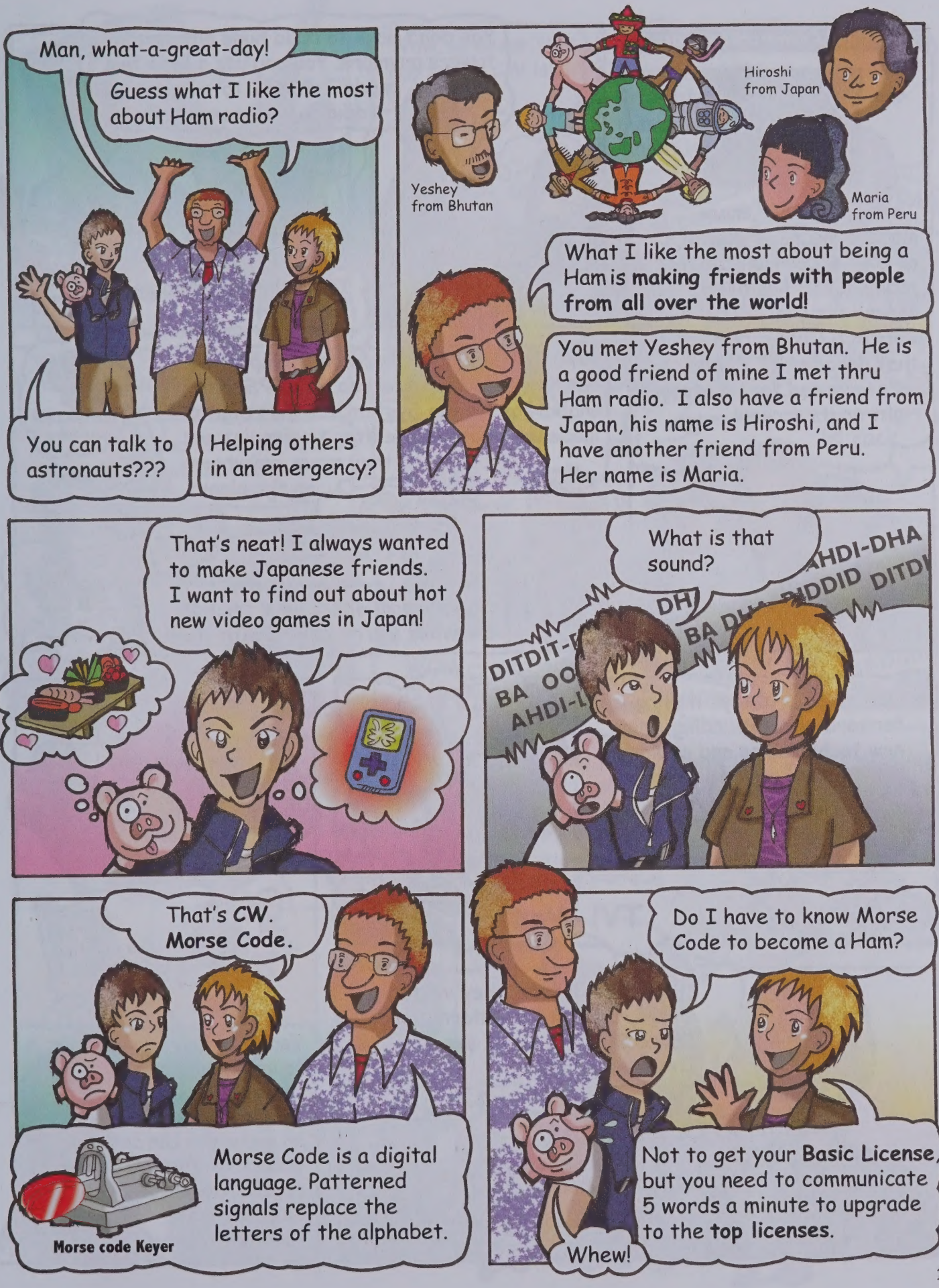

Every country has it's own call sign code system. A **French** Ham's call sign would begin with an **F**. A Ham in **Mexico** would start with **X**.
And in the **US**, it starts with **K**, **W**, **N** or **A**- something, right?


1
2
3
4
5
6
7
8
9
0
KL7
KH6
KP4
KP2
U.S. Call Sign Areas


Pretty much, unless that Ham is calling from a US territory, or from Alaska or Hawaii, Alaska's call starts with KL, Hawaii is KH.
So that's how you tell if a Ham is from America.
KL
KH


There's even more. Every U.S. Ham call contains a number. That number identifies the region where a Ham lives.
I have a **7** in my call sign. That means I'm from a **Western state.**


And my call sign starts with A5. I'm Yeshey, A51AA.
A5?
Bill, W9WL. Nice to meet you.
Can you identify where I come from by my call sign?
A5...
I have no idea.
?
?
U.S.A.
Bhutan
I am from Bhutan. It borders India and China. The Himalaya mountains run through my country ... they are very beautiful!
Wow!
Hey Yeshey, you're up
It is my turn to put in a 4-hour shift. Goodbye. Enjoy your Field Day.
Go take a break, Rick. I'll take over for a while.
380 contacts in 4 hours. Not bad, not bad. I could use some coffee.
I'll catch up with you guys later. It was nice meeting you, Zack.
Rick, would you like me to get you some coffee? I have to meet my Dad at 1300 hours in the meal tent, anyway.
No, thanks Mady. I'm going to head over there myself. Want to come along?
Sure. You coming, Zack?
Sure.


Man, what-a-great-day!
Guess what I like the most about Ham radio?
You can talk to astronauts???
Helping others in an emergency?
Yeshey from Bhutan
Hiroshi from Japan
Maria from Peru
What I like the most about being a Ham is **making friends with people from all over the world!**
You met Yeshey from Bhutan. He is a good friend of mine I met thru Ham radio. I also have a friend from Japan, his name is Hiroshi, and I have another friend from Peru. Her name is Maria.
That's neat! I always wanted to make Japanese friends. I want to find out about hot new video games in Japan!
What is that sound?
DITDIT-
BA
AHDI-
DH
BA
AHDI-DHA
DITDI
That's **CW. Morse Code.**
Morse code Keyer
Morse Code is a digital language. Patterned signals replace the letters of the alphabet.
Do I have to know Morse Code to become a Ham?
Not to get your **Basic License**, but you need to communicate 5 words a minute to upgrade to the **top licenses**.
Whew!

Digital Communications

There are other, more modern means of **digital**, or **DATA**, **communications** today. **RTTY** has been around for years. The **IC-756PROII** has a feature that decodes RTTY and let's you read text messages right on its screen!

You don't have to build huge antenna towers anymore. You can use a sensitive data mode -- **PSK31** to tie your radio to your computer.

CQ CQ

It combines 2 hobbies together!

APRS™or Automatic Positioning Reporting System is popular now, too. It's **GPS**, or Global Positioning System, but this digital mode uses **space satellites** to pinpoint and track people as they move, anywhere on the planet.

YooHoo, Look over here

Here I am!

Hey, I'm Over here

So you know where your friends are while you're talking with them.

Ham radio is **always moving forward and expanding**, using new technologies and exploring new ways to communicate. Like **ATV**, or Amateur TV.

HOLLYWOOD

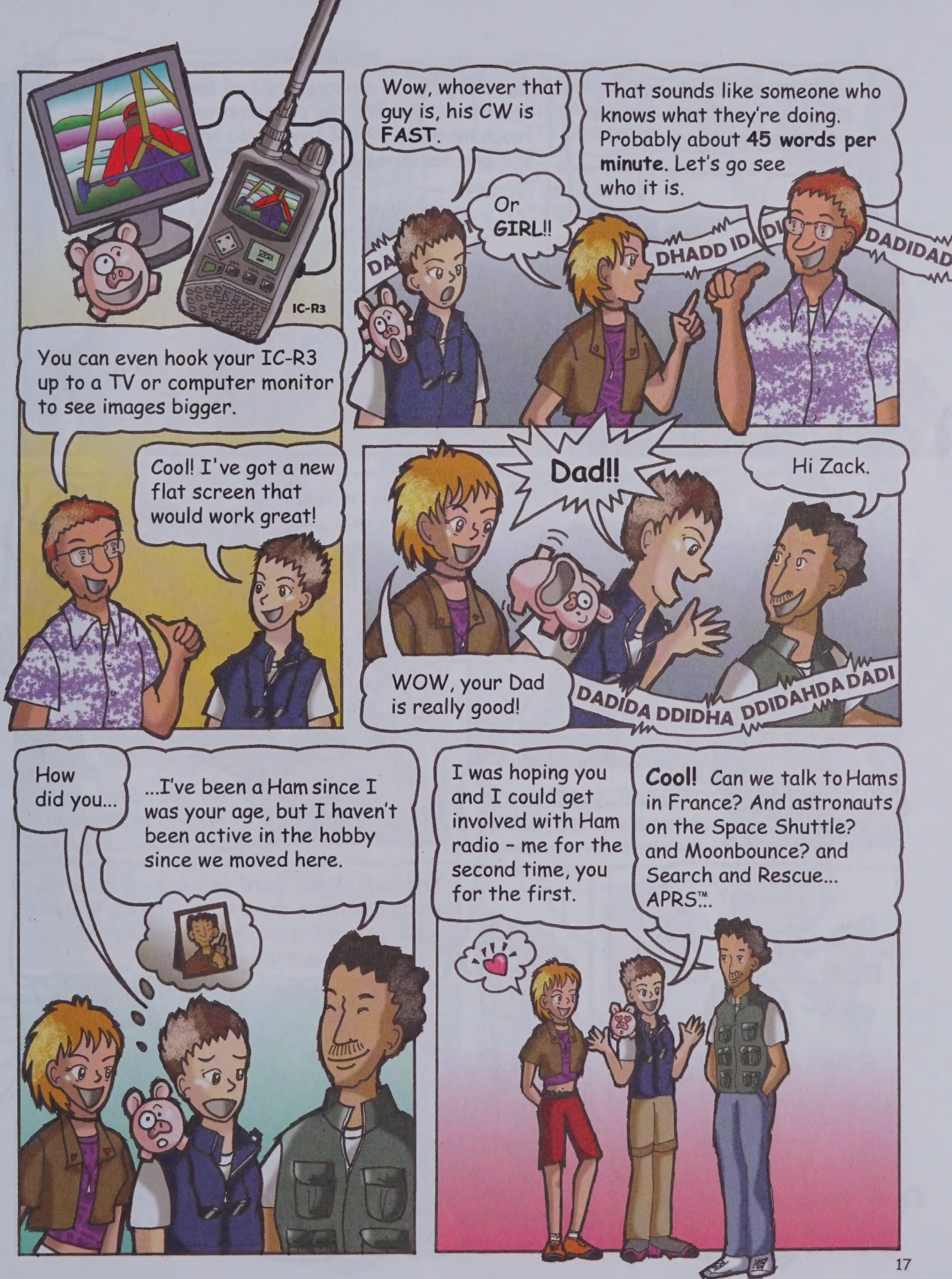
MAX!!

TV! Wow!

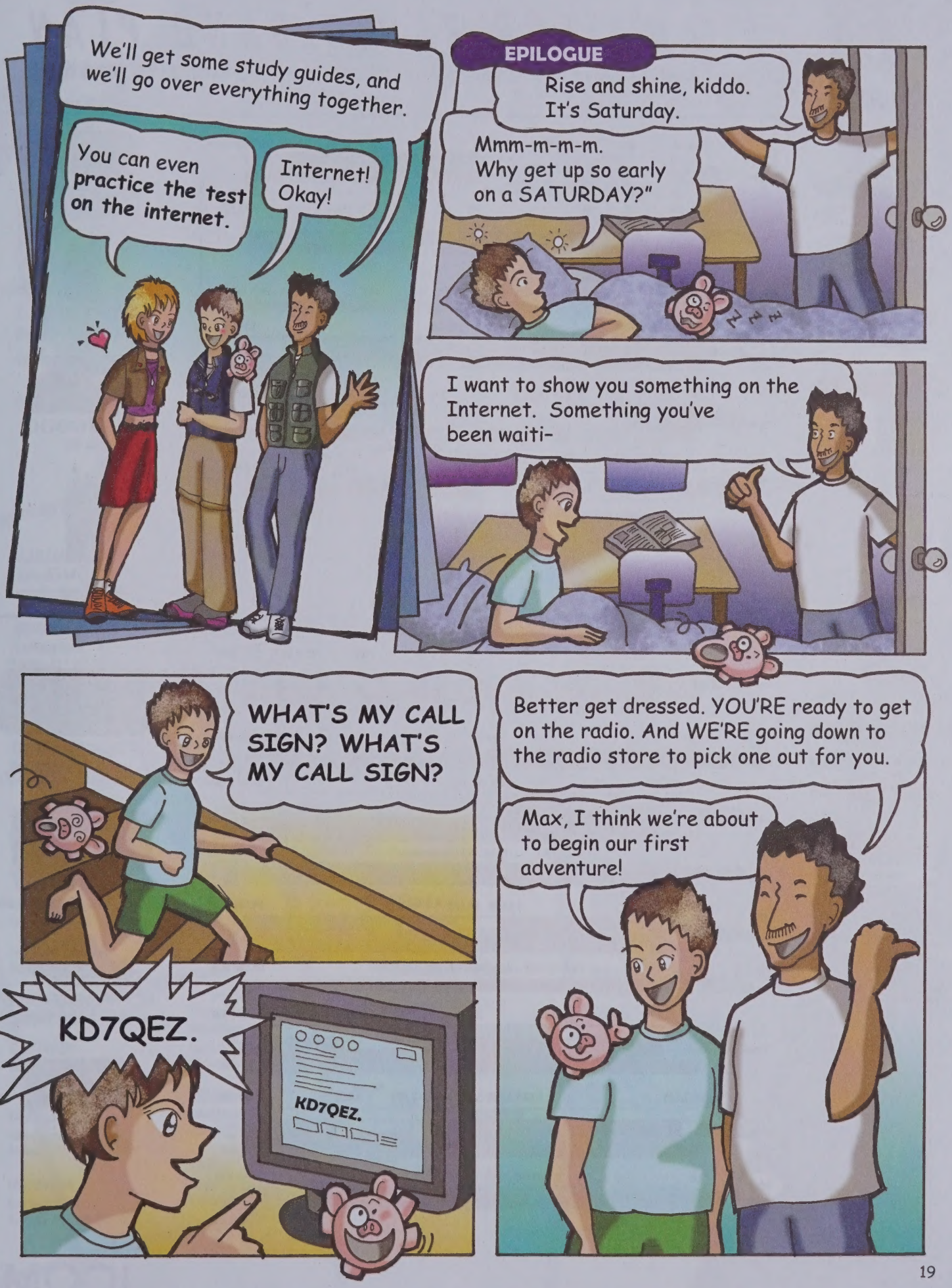
IC-R3

Like I said before, they've got a Ham radio on the International Space Station... Can I **see** who I'm talking to?

Yeah, not only can you talk to astronauts on the space station but if they're transmitting an image you can see them too. You can receive the images on an **IC-R3** if you want to.


IC-R3
You can even hook your IC-R3 up to a TV or computer monitor to see images bigger.
Cool! I've got a new flat screen that would work great!
Wow, whoever that guy is, his CW is FAST.
Or GIRL!!
That sounds like someone who knows what they're doing. Probably about 45 words per minute. Let's go see who it is.
DHADD ID
DADIDAD
Dad!!
Hi Zack.
WOW, your Dad is really good!
DADIDA DDIDHA DDIDAHDA DADI
How did you...
...I've been a Ham since I was your age, but I haven't been active in the hobby since we moved here.
I was hoping you and I could get involved with Ham radio - me for the second time, you for the first.
Cool! Can we talk to Hams in France? And astronauts on the Space Shuttle? and Moonbounce? and Search and Rescue... APRS™...

Well, maybe not everything all at once, but sure, you bet we can get going.
The computer is a necessary tool for Amateur radio operations. You are the computer expert, you can teach me some of the things you know.
We can teach each other.
Okay, Dad.
Of course, you'll have to get your amateur license.
Okay, I'm ready!
BAND
No, you're not. You've got to study.
Study?
DIDAHD
BLA
BLA
ENCY
FREC
BAND
RTM
BLA
VOLTS
DIPOLE
BLA
The test is not hard, but you will have to study and learn about Ham radio before you can get on the air. Remember our talk about the microwave oven?
NO!
Oh, yeah. Wouldn't want to cook Max!


We'll get some study guides, and we'll go over everything together.
You can even practice the test on the internet.
Internet! Okay!
EPILOGUE
Rise and shine, kiddo. It's Saturday.
Mmm-m-m-m. Why get up so early on a SATURDAY?"
I want to show you something on the Internet. Something you've been waiti-
WHAT'S MY CALL SIGN? WHAT'S MY CALL SIGN?
KD7QEZ.
KD7QEZ.
Better get dressed. YOU'RE ready to get on the radio. And WE'RE going down to the radio store to pick one out for you.
Max, I think we're about to begin our first adventure!

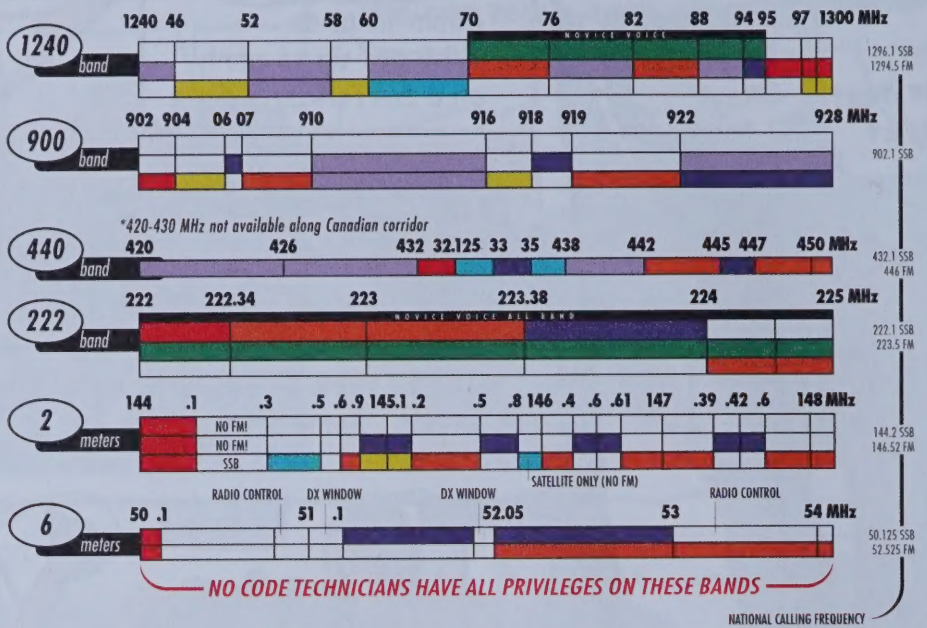
AMATEUR RADIO BAND PLAN

Under restructuring all HF classes retain band privileges as indicated. ***General Class now 5 WPM!***

UHF/VHF

NOVICE VOICE AND DATA*
AMATEUR TELEVISION FAST SCAN
SATELLITE (NO FM)
CW AND WEAK SIGNAL "NOVICE"
DIGITAL
FM SIMPLEX
SSB
FM REPEATER

*Grandfathered
All old & new license classes retain their operating privileges after April 15, 2000.


1240 band
1240 46 52 58 60 70 76 82 88 94 95 97 1300 MHz
NOVICE VOICE
1296.1 SSB
1294.5 FM
900 band
902 904 06 07 910 916 918 919 922 928 MHz
902.1 SSB
*420-430 MHz not available along Canadian corridor
440 band
420 426 432 32.125 33 35 438 442 445 447 450 MHz
432.1 SSB
446 FM
222 band
222 222.34 223 223.38 224 225 MHz
NOVICE VOICE ALL BAND
222.1 SSB
223.5 FM
2 meters
144 .1 .3 .5 .6 .9 145.1 .2 .5 .8 146 .4 .6 .61 147 .39 .42 .6 148 MHz
NO FM!
NO FM!
SSB
SATELLITE ONLY (NO FM)
144.2 SSB
146.52 FM
6 meters
50 .1 RADIO CONTROL DX WINDOW 51 .1 DX WINDOW 52.05 53 RADIO CONTROL 54 MHz
50.125 SSB
52.525 FM
NO CODE TECHNICIANS HAVE ALL PRIVILEGES ON THESE BANDS
NATIONAL CALLING FREQUENCY

IC-2720H
AM, FM/2M, 440

IC-T90A
AM, FM, WFM/2M, 6M, 440

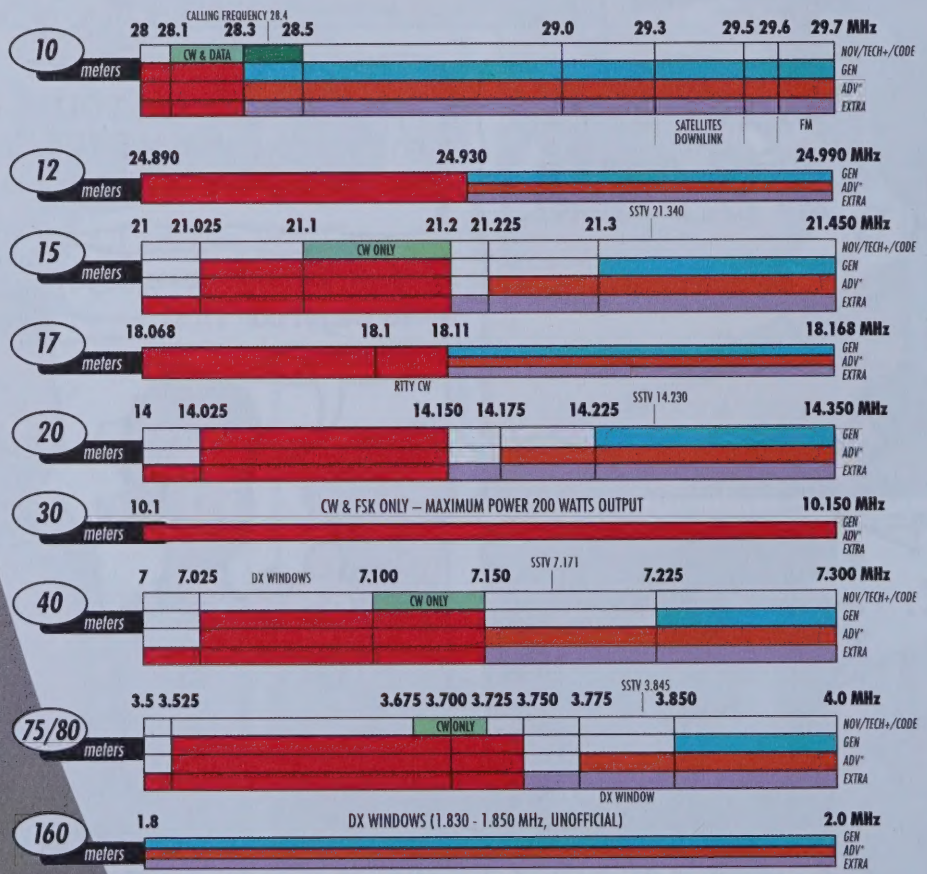
IC-V8000
FM/2M

IC-V8
FM/2M

HF Bands

NOVICE/TECHNICIAN W/CODE, CW*
NOVICE/TECHNICIAN PLUS, FOX*
GENERAL VOICE, CW, SSTV, FAX
ADVANCED VOICE, CW, SSTV, FAX
EXTRA VOICE, CW, SSTV, FAX
CW, FSK
NO PRIVILEGES

*Grandfathered
All old & new license classes retain their operating privileges after April 15, 2000.



IC-756PROII
AM, FM, SSB, CW, RTTY/HF, 6M

IC-746PRO
AM, FM, SSB, CW, RTTY/HF, 2M, 6M

IC-706MKIIG
AM, FM, SSB, CW, RTTY/HF, 2M, 6M, 440

IC-718
AM, SSB, CW, RTTY/HF

Developed by
Gordon West, WB6NOA,
RADIO SCHOOL, INC.,
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February, 2002.

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Here's where you can learn more about how to become a licensed ham radio operator:

Amateur Radio Relay League (ARRL)

www.arrl.org
1-800-32NEWHAM
326-3942

The ARRL provides information for anyone interested in Amateur Radio. Through books, tapes, maps, and a list of ARRL-affiliated ham clubs, you will be able to find the answers to all your questions about Amateur Radio. To find out more about Amateur Radio and the ARRL check out www.ARRL.org.

Gordon West Radio School

1-714-549-5000
E-mail: wb6noa@arrl.net
Gordon West offers free classes for kids, plus free instructor training seminars. West has trained 8 out of 10 HAMS through his books, tapes and classes.

Or check with your school's science teacher, school librarian, or your local public library.

Here's where you can learn more about amateur radio and purchase Icom radios in the U.S.

ALABAMA
GigaParts, Inc.
Huntsville, AL • 256-535-4442

ARIZONA
Ham Radio Outlet
Phoenix, AZ • 602-242-3515

P.A.C.E.
Tucson, AZ • 520-888-3333

CALIFORNIA
Ham Radio Outlet
Anaheim, CA • 714-533-7373

Ham Radio Outlet
Burbank, CA • 818-842-1786

Ham Radio Outlet
Oakland, CA • 510-534-5757

Ham Radio Outlet
San Diego, CA • 858-560-4900

Ham Radio Outlet
Sunnyvale, CA • 408-736-9496

Jun's Electronics
Culver City, CA • 310-390-8003

COLORADO
Ham Radio Outlet
Denver, CO • 303-745-7373

CONNECTICUT
Lentini Communications
Newington, CT • 860-666-6227

DELAWARE
Ham Radio Outlet
Newcastle, DE • 302-322-7092

FLORIDA
A.E.S. Orlando
Orlando, FL • 407-894-3238

Cedar Distributors (Export)
Miami, FL • 305-597-3090

Eli's Amateur Radio
Ft. Lauderdale, FL • 954-525-0103

Mike's Electronics
Ft. Lauderdale, FL • 954-491-7110

Portable Communication (Export)
Hialeah, FL • 305-822-2258

RF Components (Export)
Miami, FL • 305-597-9269

YV-5 Communications (Export)
Miami, FL • 305-577-9960

GEORGIA
Ham Radio Outlet
Atlanta, GA • 770-263-0700

IDAHO
Ross Distributing Co.
Preston, ID • 208-852-0830

ILLINOIS
Amateur Radio Toy Store, Inc.
Wheaton, IL • 630-668-9577

INDIANA
Ham Station
Evansville, IN • 812-422-0231

KANSAS
Associated Radio Communications
Overland Park, KS • 913-381-5900

MICHIGAN
ComDaC Radio
St. Joseph, MI • 616-982-0404

MINNESOTA
Radio City, Inc.
Mounds View, MN • 763-786-4475

MISSOURI
Gateway Electronics
St. Louis, MO • 314-427-6116

MONTANA
AmCom
Lake Side, MT • 406-884-3052

NORTH CAROLINA
Communications Headquarters
Wilmington, NC • 910-791-8885

NEVADA
A.E.S. Las Vegas
Las Vegas, NV • 702-647-3114

NEW HAMPSHIRE
Ham Radio Outlet
Salem, NH • 603-898-3750

NEW JERSEY
KJI Electronics
Caldwell, NJ • 973-364-1930

NEW YORK
Barry Electronics
New York, NY • 212-420-0500

Ham Central
Poughkeepsie, NY • 845-462-0415

OHIO
Amateur Electronic Supply
Wickliffe, OH • 440-585-7388

R &L Electronics
Hamilton, OH • 513-868-6399

Universal Radio Inc.
Reynoldsburg, OH • 614-866-4267

OREGON
Ham Radio Outlet
Portland, OR • 503-598-0555

SOUTH DAKOTA
Burghardt Amateur Elect.
Watertown, SD • 605-886-7314

TENNESSEE
CT Morgan
Chattanooga, TN • 423-629-7911

Memphis Amateur Electronics
Memphis, TN • 901-683-9125

TEXAS
Austin Amateur Radio Supply
Austin, TX • 512-454-2994

Houston Amateur Radio Supply
Spring, TX • 281-355-7373

KComm, Inc.
San Antonio, TX • 210-344-3311

Rad-Com Radio
Lubbock, TX • 806-792-3669

Texas Towers
Plano, TX • 972-422-7306

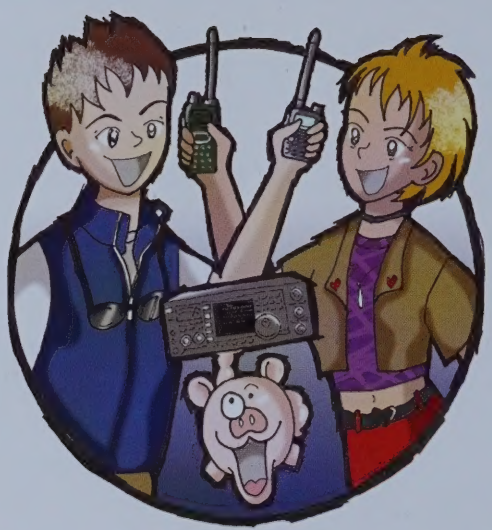
UTAH
Communication Products
Midvale, UT • 801-567-9944

VIRGINIA
Ham Radio Outlet
Woodbridge, VA • 703-490-4664

WASHINGTON
Alf Enterprises
Arlington, WA • 360-403-4840

Radio Depot
Seattle, WA • 206-763-2936

WISCONSIN
A.E.S. Milwaukee
Milwaukee, WI • 414-358-4088



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